

Nov. 17, 1936.

I. W. GREEN

2,061,273

REPERTORY DIAL

Filed May 22, 1935

3 Sheets-Sheet 1

FIG. 1

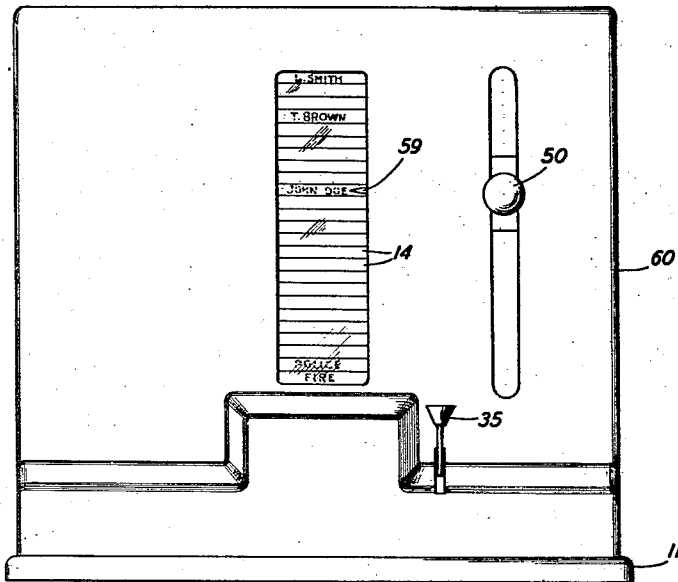
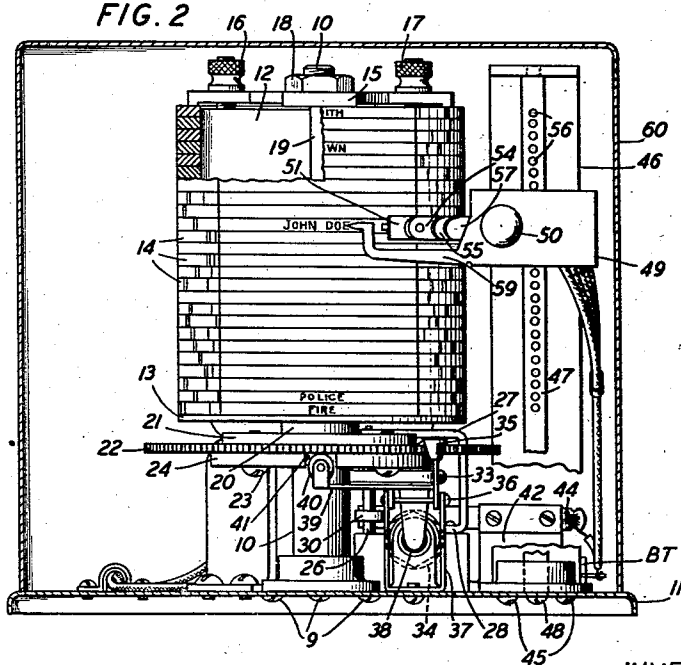


FIG. 2



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FIG. 3

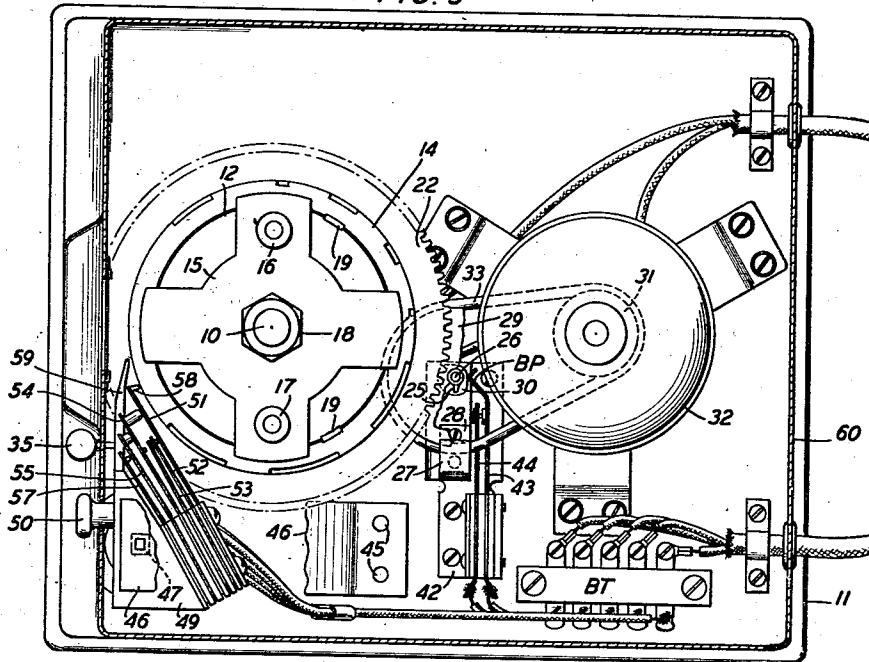
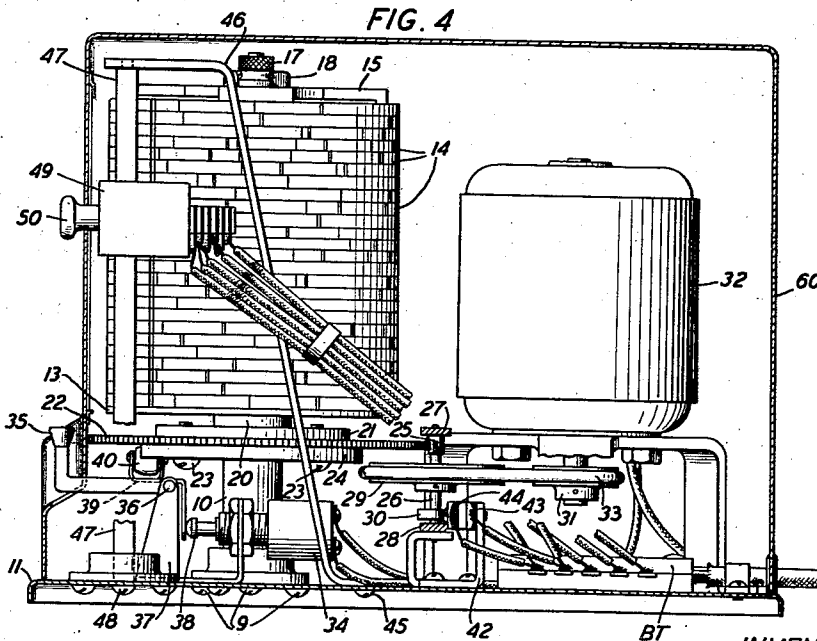


FIG. 4



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FIG. 7

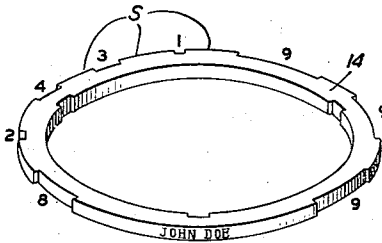


FIG. 5

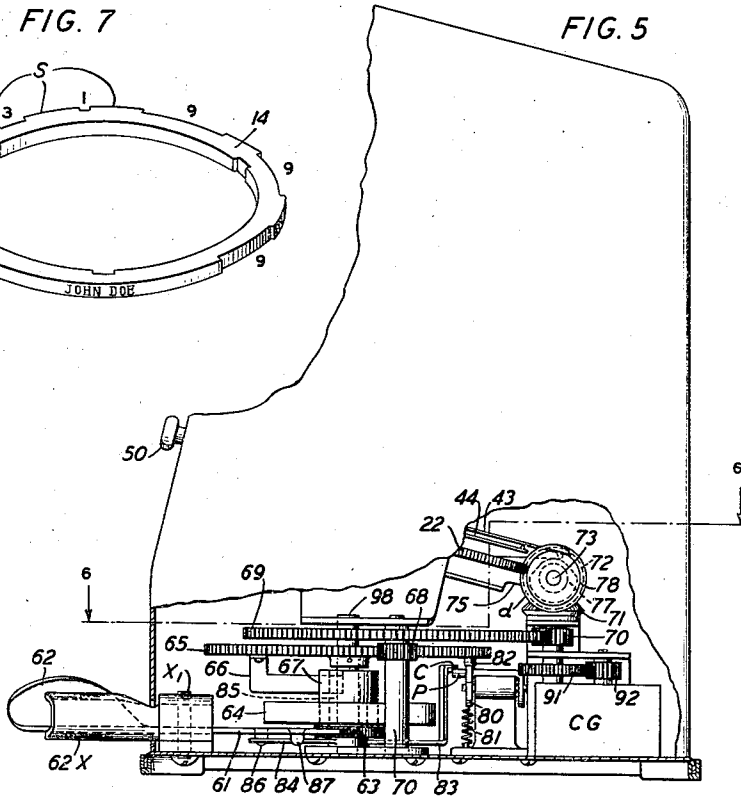
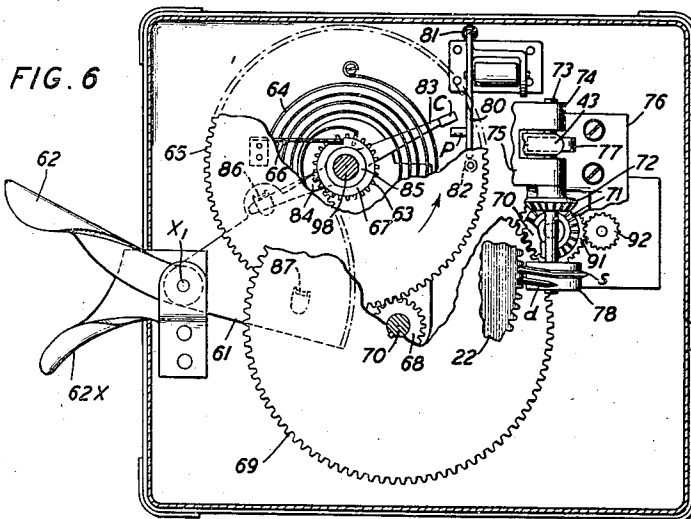


FIG. 6



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2,061,273

REPERTORY DIAL

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Application May 22, 1935, Serial No. 22,692

9 Claims. (Cl. 179—90)

This invention relates to call transmitters used in automatic telephone systems and more particularly to the type of transmitter generally known as repertory dials.

In such call transmitter discs are provided at their peripheries with groups of teeth disposed in a manner to form calling codes, these discs, together with a selecting mechanism actuated thereby, cooperating for controlling the operation of pulsing contacts for transmitting trains of impulses according to the character of the code element selected. These discs are formed with radial slots for mounting them on a rotatable frame and a spring is provided for holding them in position on the frame. In the manufacture of such discs, however, it has been found practically impossible to space the teeth and the slots sufficiently accurately as to secure their alignment on their mounting frame with respect to a selecting arm and therefore the operation of this arm relative to the operation of the pulsing contacts, thus resulting in the so-called mutilation or clipping of the pulses and the faulty operation of the switches controlled thereby.

The object of the invention is to improve the construction of such transmitters and to simplify their operation.

A feature of this invention consists in employing a step-by-step drive instead of a continuous drive for the drum which carries the code discs which control the masking of the impulses. The drum has a gear wheel which is advanced by a pin on the same member that operates the pulsing contacts, giving complete assurance that the drum can be advanced only during the closed portion of the pulsing period and avoiding clipping of the pulses by the masking contacts at the beginning and end of a train of impulses.

Another feature consists in forming the code elements in the shape of rings and providing a drum over which these rings are slipped, the assembly being clamped in place on the drum.

Another feature consists in eliminating the index card heretofore used by marking the name individual to each ring on the ring itself thereby avoiding any confusion in assembling the rings on the drum, a window being provided in the casing through which the portions of the rings bearing the names can be readily seen.

A further feature consists in the use of a three level code ring to avoid unnecessary operation of the off-normal springs which control the telephone set circuit. This permits the driving effort to be reduced by providing a separate step for the final restoration of such off-normal springs.

Other features and advantages of the invention will appear from the following description and by the claims appended thereto, reference being had to the accompanying drawings in which,

Fig. 1 is a front elevation view;

Fig. 2 is a front assembly view of the mechanism showing the housing in section;

Fig. 3 is a top view of the mechanism;

Fig. 4 is a left side view showing the drum operating mechanism;

Fig. 5 is a side view of a modification of the transmitter showing the housing with portions cut away;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 5; and

Fig. 7 is a perspective view of a code ring used in the transmitter.

As shown in Figs. 2, 3, and 4, a spindle 10 is securely mounted on a base 11 as by a number of screws 9 and on this spindle is rotatably mounted a drum member 12 having a flange portion 13 on which rest a plurality of code elements in the form of rings 14, mounted in superposed relation on the drum 12, these rings being clamped on the drum 12 by a spider member 15 under the action of screws 16 and 17.

The code elements are held in adjusted relation with respect to each other by keys, such as 19, shown in Figs. 2 and 3, disposed 120 degrees apart as shown in Fig. 3 and the drum 12 is prevented from axial movement on the spindle 10 by a nut screw 18 engaging the top end of this spindle.

The drum 12 is provided with a reduced portion 20 having a flange 21 for securely mounting, as by screws 23, a gear 22 and a notched ring 24. The drum 12 and the code elements 14 carried thereby are rotated intermittently through the operation of a rotatable finger member 25 shown in Figs. 3 and 4 disposed in operative relation with the gear 22. Finger member 25 is mounted on a shaft 26 journaled in bearings 27 and 28 and carries a pulley 29 and an impulse cam 30 of insulating material, pulley 29 being operatively connected to a pulley 31 securely mounted on the armature shaft of a motor 32 by a belt 33.

A switch 34, shown in Figs. 2 and 4, which may be of any well-known construction, is provided for controlling the operation of motor 32 through the operation of a manually operable handle 35 pivoted as at 36 on a bracket 37 securely mounted on the base 11 and engaging the movable element 38 of switch 34. Handle lever 35 is provided with a laterally extending arm 39 shown in Figs. 2 and 4 provided with a roller 40 normally engaging

the notch 41 of ring 24 under the tension of the switch retractile spring, not shown.

On base 20 is mounted a bracket 42, shown in Figs. 2, 3, and 4, provided for mounting a pair of normally closed springs 43 and 44, spring 43 having at its free end a bent portion BP extending in operable relation with the impulse cam 30 for opening the contact thus formed upon the operation of the motor 32.

On the base 11 is secured as by screws 45 an upwardly extending bracket 46 shown in Figs. 2, 3, and 4 provided for securing the top end of a vertically disposed bar 47 secured at its lower end to the base 11 by a screw 48. On bar 47 is slidably mounted a block 49 of insulating material provided with a thumb screw 50 for engaging any one of the recesses 51 in the bar 47 for holding the block in adjusted position and on this insulating block are mounted contact members 51, 52, 53, 54, 55, and 57. Contact member 51 is provided with a shoe member 53 for engaging the surface of the code ring selected and cooperates with contact 52 for negating predetermined operations of the impulse contact members 43 and 44 according to the character of the code element with which they are operatively associated, the contact members 53, 54 and 55, 57 being provided to perform switching functions well known in the telephone art and form no part of this invention.

On the insulating block 49 is mounted an index member 59 which cooperates with marks on the rings for indicating the code to be transmitted, these marks being engraved on the code elements or made in the form of printed indices secured on the code elements as by suitable adhesive, and connections are made to contacts 51, 52; 53, 54; 55, 57; and 43, 44 through a suitable bank terminal BT shown in Figs. 3 and 4. A casing 60 shown in elevational view in Figs. 1 and 2 is provided for housing the transmitter mechanism and may be secured to the base 11 in any suitable manner.

The code ring 14 shown in the enlarged view in Fig. 7 is cut with notches representing the call number 99913428 and the usual interdigit spaces IS of equal length.

In the modification shown in Figs. 5 and 6, a gear sector 61 pivoted as at X1 is provided with a handle 62 and engages a pinion 63 for rotating it and simultaneously tensioning a spiral spring 64 having its outer end connected to a gear 65, the movement of this gear through the engagement of pawl 66 with a ratchet shaped tooth in the hub 67 of pinion 63 rotates a pinion 68 secured to the underside of gear 69 and keyed to a shaft 70. The gear 69 engages with a pinion 70 for rotating the angle gears 71 and 72 and thereby the shaft 73 which is journaled on bearings 74 and 75 of bracket 76 and this shaft carries a cam 77 of insulating material for actuating the contact springs 43 and 44 shown in Fig. 5. A wheel having a driving portion *d* and a stopping portion *s* is mounted at one end of shaft 73 and engages the gear 22 for actuating the drum 12 and the code elements 40 carried thereby intermittently in timed relation with the impulse cam 77 and a pawl 80 shown in Figs. 5 and 6 is held against the underside of gear 65 under the tension of a spring 81 for engaging a stop pin 82 carried by this gear for stopping it in its normal unoperated position. The disengagement of this pawl from the pin 82 is effected by arms 83 and 84 secured on the ends of a sleeve 85 loosely mounted on shaft 98

and operated through the engagement of lugs 86 and 87 of gear sector 61 for engaging the camming portion C of arm 83 with the pin P extending laterally from pawl 80.

In a typical example of operation of the device shown in Figs. 1, 2, 3, and 4, block 49 and the index 59 carried thereby are moved manually in registry with the code element bearing the code designation desired to be transmitted and is secured in that position by the tightening of thumb screw 50 engaging with one of the recesses 51 in the guiding bar 47. The movement of block 49 is effective to position the spring 51 in operative relation with the code element indicated by the index 59 when in registry with the code ring bearing the indicia desired. The manual operation of lever arm 35 is effective to actuate the movable member 33 of switch 34 for engaging its contacts and thereby closing the operating circuit of motor 32 and simultaneously moving the arm 39 and the roller 40 carried thereby from the notch 41 of ring 24. The operation of motor 32 is effective to rotate the shaft 26 for actuating the cam 30 and thereby the pulsing spring 43. The movement of shaft 26 rotates finger member 25 for actuating the gear 22, one tooth for each turn of shaft 26, and thereby actuating the code elements for operating the shunting contacts 51 and 52 for negating a number of operations of pulsing cam 30 according to the character of the code element or ring selected. It is to be noted, however, that the impulse springs are operated while the code elements are at rest due to the angular relation of the finger 25 with the pulsing cam 30 on shaft 26, this operation being continued until the notch 41 of disc 24 registers with the roller 40 to permit the opening of the switch 34 while stopping the drum 12 and the code elements carried thereby in their normally unoperated position, thus preparing the transmitter for a subsequent operation.

In a typical example of operation of the transmitter using the modification shown in Figs. 5 and 6, the movement of gear sector 61 through the operation of handle 62 toward the immovable handle 62X is effective to rotate the pinion 63 for tensioning the motor spring 64 and simultaneously engaging the ratchet tooth of hub 67 with the pawl 66 carried by gear 65. The lug 87 carried by gear sector 61 engages the arm 84 at the lower end of sleeve 85 for imparting a small angular movement to arm 83 secured to the upper end of sleeve 85 for engaging the cam portion C of this arm with the pin P and thereby camming this pawl from the stop pin 82 for releasing gear 65. Upon the return movement of gear sector 61 and the reverse movement of pinion 63 and therefore the movement of gear 65 is effective to rotate the pinion 68, the shaft 70 and the gear 69 secured thereto for actuating the pinion 70 and the angle gears 71 and 72, the latter rotating the shaft 73 for imparting movement to the impulse cam 77 and the driving wheel 78. The movement of gear 78 is effective to rotate the gear 22 intermittently in timed relation with respect to the operation of impulse springs 43 and 44 shown in Fig. 5 by the cam 77, the operation of motor spring 64 operating under control of an ordinary centrifugal governor CG driven by gears 91 and 92, gear 91 being secured on the shaft of pinion 70 and angle gear 71.

Upon the return movement of gear sector 61, the stop lug 86 carried thereby engages the arm 75

84 for imparting a small angular movement to sleeve 85 for moving the arm 83 away from the pin P of pawl 80 to permit this pawl to re-engage with the pin 82 carried by gear 65 for stopping the movement of this gear and thereby preparing the transmitter for a subsequent operation, the operation of contact members 51 and 52 through the operation of the code elements selected in each case being effective to negative a predetermined operation of the pulsing mechanism for sending sets of impulses according to the code of such element.

What is claimed is:

1. A call transmitter adapted to automatically transmit successive sets of impulses corresponding to characters of a telephone number, characterized in this that a step-by-step drive is utilized for the shaft carrying the code members which control the masking of the pulsing contacts, this shaft carrying a gear which is advanced by a pin on the same member that operates the pulsing contacts, this pin advancing the gear wheel only during the closed portion of the pulsing period.

2. A call transmitter according to claim 1, characterized in this that the shaft is in the form of a drum and the code members are in the form of rings which may be readily slipped over the end of the drum and clamped together.

3. A call transmitter according to claim 1, characterized in this that the shaft is in the form of a drum and the code members are in the form of rings slipped over the drum and clamped together and that each code ring carries a name card as part of the code ring.

4. A call transmitter according to claim 1, characterized in this that the shaft is driven by an electric motor, the circuit of which is closed by the momentary depression of a spring-pressed lever which is provided with a roller normally located in a notch in a ring, this ring acting on the motor-starting lever to maintain the motor circuit closed until the roller is again aligned with the notch as the shaft completes its revolution.

5. In a call transmitter adapted to automatically transmit in succession sets of impulses corresponding to characters of a telephone number, a pair of impulse contacts, a rotating member for intermittently opening and closing said contacts at a predetermined rate, code rings having their peripheral surfaces differently notched to transmit codes of impulses, each ring bearing a station designation on a smooth portion of its peripheral surface, a drum upon which said rings are mounted in superposed relation, a source of driving energy, a drive connection between said source and said drum and rotating member, the connections between said source and said drum and member driving the latter a number of revolutions for each revolution of said drum, shunt

springs adapted to be manually placed in operative relation to the periphery of any ring to control the transmission of the code of impulses corresponding to said ring.

6. In a call transmitter adapted to automatically transmit successive sets of impulses corresponding to characters of a telephone number, a pair of impulse contacts, a rotating member for intermittently opening and closing said contacts at a predetermined rate, code rings having their peripheral surfaces differently notched to transmit codes of impulses, a drum upon which said rings are mounted in superposed relation, a source of driving energy, a drive connection between said source and said drum and rotating member, the connections from said source to said rotating member driving said rotating member a number of revolutions for each revolution of said drum, shunt springs adapted to be manually placed in operative relation to the periphery of any ring to control the transmission of the code impulses corresponding to said ring.

7. In a call transmitter adapted to automatically transmit in succession sets of impulses corresponding to characters of a telephone number, a pair of impulse contacts, a rotating member for intermittently opening and closing said contacts at a predetermined rate, code members, a shaft upon which said code members are mounted, a gear on said shaft, a pin on said rotating member for advancing said gear to drive said shaft and code members by an intermittent motion so that the same are advanced only during the closed portion of the pulsing period, and shunt springs adapted to be manually placed in operative relation to any code member.

8. In a call transmitter, a set of rings having cams at their peripheries, a drum for receiving said rings, means carried at the periphery of said drum and disposed in different angular relation thereon and means in said rings registering with said means on said drum for defining the angular relation of said rings with respect to each other, an impulse mechanism, and a contact controlled by the operation of said rings for negating a predetermined number of said impulses.

9. A call transmitter comprising a plurality of rings having cams at their peripheries, a drum for receiving said rings, means for rotatably supporting said drum, an impulse mechanism operatively connected to said drum, a motor, a manually operable switch for controlling the operation of said motor for actuating said drum and said mechanism, means carried by said drum for preventing the operation of said switch during the movement of said drum, and automatic operating means for opening said switch for stopping the operation of said motor.

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